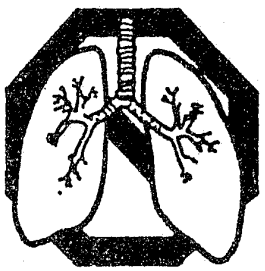
Control of Tuberculosis in Correctional Facilities

A Guide for Health Care Workers



MAKE U.S. TB FREE

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Center for Prevention Services
Division of Tuberculosis Elimination

CDC
CENTERS FOR DISEASE CONTROL

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Background/Purpose

In the May 1989 issue of the Morbidity and Mortality Weekly Report, the Department of Health and Human Services' Advisory Committee for the Elimination of Tuberculosis issued recommendations "For the Prevention and Control of Tuberculosis in Correctional Facilities." Since then, the Division of Tuberculosis Elimination has received numerous requests from correctional facilities, as well as from state and local health departments, for educational materials to facilitate training of correctional facility staff.

This Guide seeks to provide clear, accurate information to health care staff on the prevention and control of TB in correctional facilities. It can be used in developing educational programs or as a reference manual for health care workers. Drafts of the Guide were sent to staff in selected correctional facilities and health departments for review and comment. Suggested revisions were incorporated into the document. The Guide has also been reviewed and endorsed by the National Commission on Correctional Health Care and the American Correctional Health Services Association. CDC is distributing the Guide through state and local health department TB programs to federal, state, and local correctional facilities throughout the nation.

National Trends in TB

Tuberculosis is a life-threatening disease that is transmitted through the air.

Tuberculosis (TB) was once the leading cause of death in the United States. Since 1953, when nationwide reporting was first implemented, there has been a significant decrease in the number of TB cases reported annually. But this decrease has ended. Since 1984, no significant decrease has occurred; in fact, 25,701 TB cases reported in 1990 represent a 9% *increase* over the number reported in 1989.

TB has made a comeback and is accompanying the epidemic of HIV infection. TB rates have been increasing dramatically where HIV infection is most prevalent: in certain regions (particularly large urban centers) and among those population groups at greatest risk (especially 25 to 44 year-old males). But TB is both curable and preventable, even in those with HIV infection.[1] Currently available medication can treat and stop the spread of TB.

Is TB a Problem in Correctional Facilities?

TB is a *major* problem in correctional facilities, where TB cases occur overall at least 3 times more often than in the general adult population. Since 1985, eleven TB outbreaks have been recognized in prisons in eight states. In addition, in some large correctional systems, the incidence of TB has increased dramatically, resulting in case rates of between 6 and 11 times the rates in the general community.[2] This problem can be attributed to: 1) the overrepresentation of populations at high risk for TB in prisons and jails, 2) the transmission of TB infection within those facilities, and 3) the overrepresentation of persons at risk for HIV infection.[3]

Both TB and HIV strike hardest among the poor and minority groups, especially those who are injecting drug users (IDUs). These groups are overrepresented in correctional inmate populations. Correctional facilities where inmates have been screened for TB frequently find infection levels of 10% to 20%.[4] These levels are substantially higher than those that would be expected in the general population.

Conditions that facilitate the spread of TB are common in correctional facilities. Many prisons and jails are old structures with inadequate ventilation systems. Problems with overcrowding are compounded by the mobility of inmates within and between facilities. In jails, these conditions are further worsened by the unpredictability of inmates' length of stay. All of these factors place both inmates and staff at high risk for acquiring TB infection. A single case of infectious TB disease can potentially spread TB infection to large numbers of inmates, staff, and visitors.

How is TB Spread?

Tuberculosis is caused by a bacterium (*Mycobacterium tuberculosis*), often called the tubercle bacillus. TB is spread through the air by tiny airborne particles (called "droplet nuclei") which contain tubercle bacilli. People with infectious TB of the lung or larynx produce these small droplets when they cough, sneeze, sing, or talk. Droplet nuclei can remain suspended in the air, unless ventilated outside, and can then be inhaled by others.

Contact with contaminated food, dishes, clothing, or water will **not** spread TB. Smoking does not cause TB, although the frequent coughing of a smoker with TB may facilitate the spread of TB infection.

What is TB Infection?

Tubercle bacilli can enter the lungs of a person who breathes in air contaminated by someone with infectious TB. The bacteria multiply for a short time in the lungs before the immune system controls their growth. This stage is referred to as *TB infection*. However, the tubercle bacilli remain dormant in the body and can become active and cause clinical disease later in life.

A person who has TB infection without disease:

- cannot spread infection to others;
- is not considered a case of TB;
- usually has a negative chest x-ray and no symptoms of TB; but
- *does* have TB bacteria in his or her body that remain capable of causing disease at any time later in life.

A positive reaction to the Mantoux tuberculin skin test is usually the only evidence of TB infection.

What is TB Disease?

Some people with TB infection will develop *TB disease*. This can happen immediately after infection or many years later. Certain factors that suppress the immune system increase the risk of developing TB disease. Among these factors are HIV infection, chemotherapy, malnutrition, and the abuse of drugs (including alcohol). In a person with TB infection, HIV infection is by far the strongest identified risk factor for developing active TB disease.

The general symptoms of TB disease may include:

- lethargy;
- weakness;
- weight loss;
- loss of appetite;
- fever; and/or
- night sweats.

Most cases of TB disease are diagnosed when symptoms prompt the person to seek medical care. Symptoms of TB have often been present for weeks or even months before this point.

The most common site of TB disease is in one or both lungs. The symptoms of disease at this site, called pulmonary TB, may include **chronic cough, chest pain,** and **coughing up blood**. TB can also occur at any other site in the body, including the kidneys, brain, or spine. Symptoms vary depending on the site affected.

What is the Connection between TB and HIV Infection?

A person with both HIV infection and TB infection is far more likely to develop TB disease than a person with TB infection alone.[5] HIV weakens the body's immune system, allowing the tubercle bacilli to multiply rapidly and spread. There is also a greater chance that HIV-infected persons will develop TB in sites other than the lungs, especially in the lymph nodes.

All persons who have a positive tuberculin skin test should receive counseling and risk assessment for HIV infection, too.

It is especially important for people with both TB and HIV infections to take preventive TB medication. The HIV-weakened immune system makes it far more likely for them to develop TB disease than people who are not HIV infected.

If HIV risk behaviors are present or suspected, staff should strongly recommend HIV testing (see Appendix I). Treatment and preventive therapy for TB in HIV-infected persons is different than for those who are HIV negative.*

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* Inmate HIV testing laws and issues vary depending on the state or county in question. It is imperative that inmates receive counseling both before and after HIV testing, and that confidentiality be carefully maintained. Those who test positive for HIV should be educated about their risk of tuberculosis.

TB CONTROL

Every correctional facility should appoint one staff member as TB Control Officer to oversee TB control and prevention efforts. An effective TB control program in a correctional facility should consist of surveillance, containment, and assessment activities. It is the TB Control Officer's duty to ensure inmates and staff get necessary TB screening and treatment services.

SURVEILLANCE

Surveillance is the close monitoring of all inmates and staff to identify TB infection and TB disease. Surveillance is carried out through screening, diagnosis, case reporting, and contact investigations. Comprehensive and regular surveillance activities are essential to detect and prevent the transmission of TB. *Surveillance is the only way to determine the current status and trends of TB in the institution. Every new inmate or employee should be considered a potential transmitter of TB infection until proven otherwise.*

Screening for TB Infection

All employees and inmates should be screened upon employment or admission with the Mantoux tuberculin skin test. Multiple puncture tests are not recommended. After the initial screening, TB skin tests should be repeated at least annually for all inmates and for all staff who work with inmates. Results of skin testing should be compared with previous testing within the same facility, with testing done in other correctional facilities, and with infection rates locally in the general population. More frequent screening should take place in a facility if there is an increase in:

- the incidence of either TB or HIV/AIDS; or
- the incidence of TB infection (positive tuberculin skin test reactions).

TB Skin Testing - The Mantoux tuberculin skin test is given by intradermal injection of purified protein derivative (PPD) of killed tubercle bacilli, usually on the inner forearm. The site is examined by a trained health worker 48-72 hours later for a reaction. The diameter of induration is measured, disregarding erythema or bruising. Those with a positive TB skin test should receive a chest x-ray to rule out active disease and should be evaluated for preventive therapy.

False-negative reactions may occur in TB-infected persons when their immune system is weakened. This may be due to HIV infection or medications that suppress the immune system. Because immunosuppressed persons may have falsely-negative tuberculin reactions due to delayed type hypersensitivity (DTH) anergy, consideration should be given to evaluating such persons for anergy by companion testing with at least two DTH skin-test antigens, e.g., mumps, candida, and tetanus toxoid, administered by the Mantoux method.

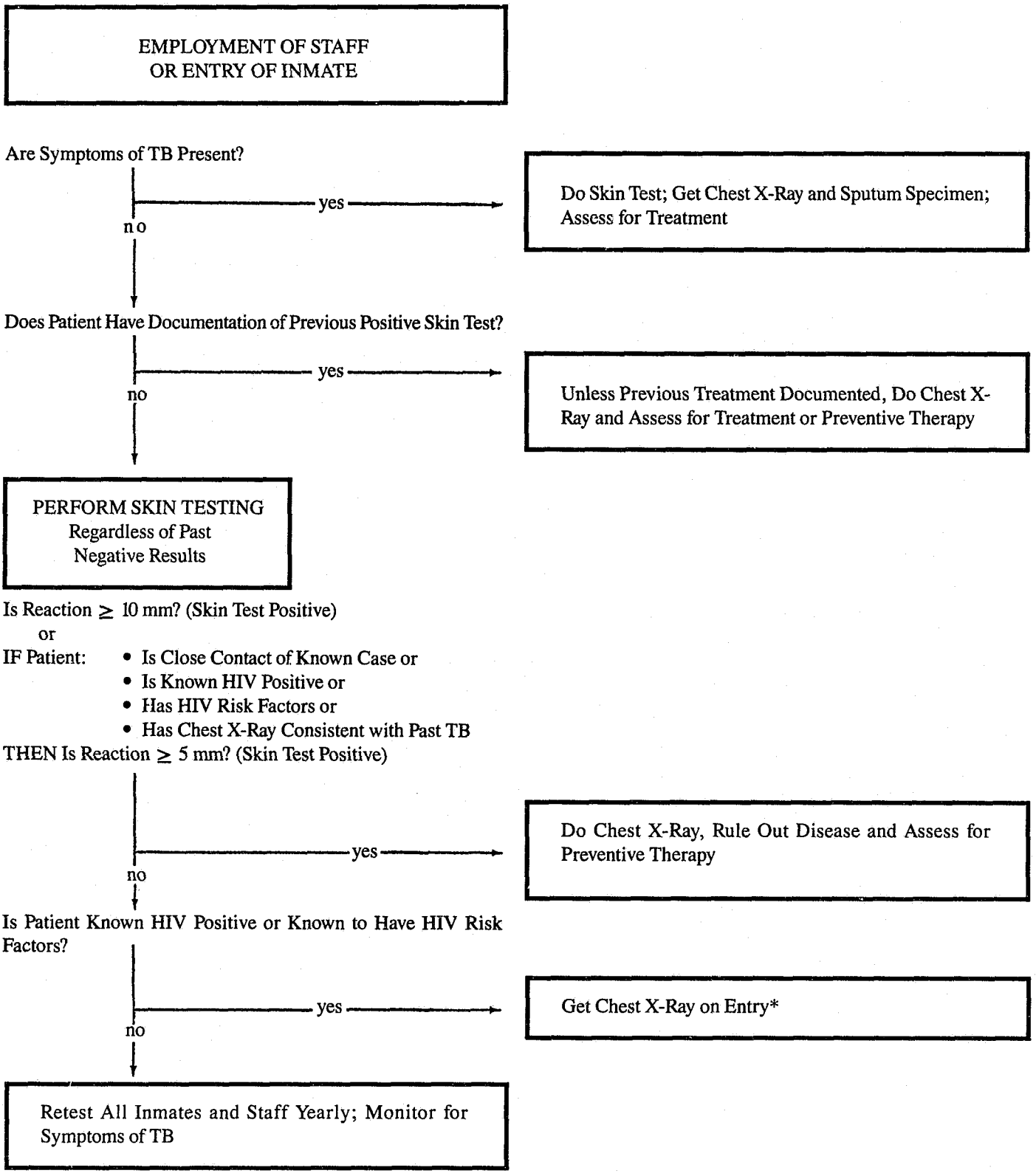
All persons with, or at risk for, HIV infection should receive an x-ray as part of initial screening, regardless of skin test reaction.

A chest x-ray should always be done within 72 hours of a positive TB skin test reading. A chest x-ray and sputum smear and culture should always be done within 72 hours of identification of symptoms of TB, such as:

- productive cough,
- coughing up blood,
- weight loss,
- loss of appetite,
- lethargy/weakness,
- night sweats, or
- fever.

Guidelines for the screening of all inmates and staff are illustrated in Figure 1.

FIGURE 1
GUIDELINES FOR SCREENING OF STAFF AND INMATES



WHEN SYMPTOMS OF TB ARE PRESENT, ALWAYS SUSPECT TB, REGARDLESS OF SKIN TEST REACTION!

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* If the skin test is ≤ 5 mm and the HIV test is positive, consider evaluating for anergy.

Diagnosis of TB Cases

Inmates or staff with TB symptoms and/or chest x-ray indicative of TB will need further tests, such as sputum or other bacteriologic specimen for "acid fast bacilli" (AFB) smear and culture.

Initially, a series of three early morning sputum specimens should be collected on successive days and examined by smear and culture. Supervision should be used to ensure proper specimen collection. Coaching is often required so that the specimens are secretions brought up from the lungs (sputum), not from the nose or mouth (saliva). Patients may be told to inhale deeply and exhale three times and then inhale swiftly, cough deeply, and spit into the sputum container. Aerosol induction of sputum may be required. Sputum collection should be carried out in accordance with the isolation procedures described under the "Containment" section of this document.

Until culture results return, the symptomatic patient is a "suspect" case. The only way to confirm the diagnosis of TB is by identifying *Mycobacterium tuberculosis* through culture. Drug susceptibility studies should be done on all initial specimens and on cultured bacilli from patients not responding to treatment.

Extrapulmonary TB - Diagnosis of extrapulmonary TB can be difficult. Many sites other than the lungs can be affected, and symptoms will be different for each site. When extrapulmonary TB is suspected, other clinical specimens should be obtained (e.g., urine, pleural fluid, biopsy specimens, etc.). Extrapulmonary TB occurs more often in HIV-infected persons than in persons without HIV infection.

Case Reporting

All suspected or diagnosed cases of tuberculosis should be reported to the health department according to state laws and regulations. *Do not wait for results of sputum smears and cultures before reporting a suspect TB case.* The reporting of a TB case makes the resources of the health department available to assist in proper management of the case and in the evaluation of contacts. In addition, each facility should maintain an in-house reporting and record-keeping system (see Appendix II).

Contact Investigation

Whenever pulmonary or laryngeal TB disease is suspected or diagnosed, all close contacts should be skin tested, unless there is a documented history of a positive skin test. Close contacts include any people who have shared air in an enclosed space with a potentially infectious TB case. Close contacts of inmates could include all cellmates, all inmates and staff on the same tier, or all inmates and staff in the building who share air. Visitors could also be close contacts of an infectious TB case. This depends on the ventilation system in the facility (air ducts, connecting hallways, windows, etc.), and on the infectiousness and behavior of the source case. Close contacts of staff or of recently admitted or released inmates could include friends, family members, and co-workers.

It is important to maintain the confidentiality of the person with TB disease during contact investigations. Your state health department TB program can provide you with specific information on the rules and regulations regarding this for your state.

Contacts who 1) have a positive skin test ($\geq$ 5 mm), 2) have a history of a positive skin test, or 3) are HIV positive, regardless of skin test results should receive a chest x-ray. If there is no evidence of disease, these contacts should receive preventive therapy, unless medically contraindicated. *Contacts with an initially negative tuberculin skin test should be retested in 10 to 12 weeks.*

The "concentric circle" approach can be used to determine the extent of contact investigation needed. First, identify those persons who were most likely to have been infected by the source case. Include in this first group: persons who shared breathing space for the longest time with the source case, persons who may have spent less time with the source case but who are immunosuppressed, and persons who have TB signs and/or symptoms. If positive TB skin test reactions are identified among persons in the first group or "circle" (with no previous history of TB infection), new infections have probably occurred. Expand the investigation in widening circles until skin testing identifies a group of persons among whom there is no evidence of new TB infection.

CONTAINMENT

Containment activities prevent the transmission of TB infection. These activities include isolating suspects and infectious cases, treating all suspects and diagnosed cases, and providing preventive therapy to those with TB infection but no disease.

Education of both inmates and staff that openly addresses questions and concerns is vital to containment efforts. Some facilities have successfully used highly motivated inmates as peer educators.

Isolation

To prevent the spread of TB infection to staff and inmates, it is important to recognize and isolate anyone who has symptoms suggestive of TB disease. Officers and health staff should suspect TB in anyone with a cough lasting longer than two weeks, especially if other signs of TB are present. This is true even if the inmate or employee is a smoker.

Whenever possible, persons suspected of having TB should be placed in *AFB isolation* until they are no longer infectious. AFB isolation rooms should be under negative pressure so that all air currents come **into** the room; air should be vented to the outside of the building, not recirculated. If necessary, the infectious case should be transferred to a facility in which AFB isolation is available. TB patients and suspects should be released from isolation *only* after infectiousness has been ruled out. Three negative sputum smears collected on consecutive days must be obtained before a patient who has had a positive smear can be considered non-infectious.

Cough-inducing procedures can place health staff and nearby inmates at special risk of acquiring TB infection. These procedures include sputum collection, bronchoscopy, and the administration of aerosolized pentamidine. It is very important to carry out such procedures in an individual room or booth with negative pressure relative to adjacent rooms and hallways, ideally with room or booth air exhausted directly to the outside and away from all windows and air intake ducts. Patients should remain in the booth or treatment room and not return to common areas until coughing has subsided.

Some hospitals and shelters for the homeless use ultraviolet (UV) lights to kill tubercle bacilli in the air. The installation of UV lights may be considered in some facilities, especially in high volume, high turnover holding facilities. However, UV lights should be used *only* to supplement other control measures (such as good ventilation). Proper precautions and maintenance of the lights is essential.[6]

Prevention of TB Disease

Preventive therapy substantially reduces the risk of developing active TB in infected persons. All persons who have a positive skin test should be considered for preventive therapy when active disease has been ruled out. Highest priority for preventive treatment should go to skin-test positive persons in the following high-risk groups, *regardless of age*:

- persons with HIV infection
- close contacts of infectious TB cases
- tuberculin convertors: persons who have had a $\geq$ 10 mm increase (or $\geq$ 15 mm if 35 years of age or older) in skin test reaction within a 2-year period
- previously untreated or inadequately treated persons with abnormal chest radiographs consistent with old, healed TB
- injecting drug users
- persons with medical conditions that increase the risk of TB if infected, including:
    - silicosis
    - diabetes mellitus
    - prolonged corticosteroid therapy
    - immunosuppressive therapy
    - hematologic and reticuloendothelial diseases
    - end-stage renal disease
    - intestinal bypass
    - post-gastrectomy
    - chronic malabsorption syndrome
    - carcinomas of the oropharynx and upper gastrointestinal tract
    - being 10% or more below ideal body weight

In addition, skin-test positive persons who are less than 35 years of age should be considered for preventive therapy regardless of the above risk factors.

For HIV-positive individuals who do not have positive skin test results, preventive therapy may be considered when there is clinical or laboratory evidence of severe immunosuppression and the individual:

- is from an area where tuberculosis is endemic;

- is an injecting drug user;
- is a close contact of an infectious TB case;
- has a history of a positive skin test reaction; or
- has a radiographic abnormality consistent with past TB.

Clinical or laboratory evidence of immunosuppression can be derived from antibody testing or CD-4 counts.

Treatment of TB Cases

When symptoms and/or results of skin test, chest x-ray, and sputum smear suggest active TB, the suspected case should be placed on a TB treatment regimen consisting of several drugs until TB has been ruled out.

Compliance is a major issue in the treatment of TB in correctional institutions. When non-compliance occurs in a person with clinically active disease, the TB Control Officer may need to take special measures to ensure that the inmate ingests his or her medication, since such a person poses a serious threat to the health of others.

Clinical response to treatment should be monitored, since the development of drug resistance can be a problem. Persons with clinically active disease should be monitored bacteriologically through sputum examination at least monthly until conversion to negative. Persistence or reappearance of organisms in the sputum smear should create a high index of suspicion for drug-resistant disease or noncompliance with therapy. When this occurs, evaluate compliance and perform drug susceptibility tests.

Administration of Therapeutic Regimens

DRUGS USED FOR THE TREATMENT
AND PREVENTION OF TUBERCULOSIS

Drugs Used:	Isoniazid (INH)	300 mg daily or 900 mg 2X weekly
	Rifampin (RIF)	600 mg daily if $\geq$ 50 kg 450 mg daily if $<$ 50 kg or same dosages 2X weekly
	Pyrazinamide (PZA)	20-30 mg/kg daily or 50 mg/kg 2X weekly
	Ethambutol (EMB)*	25 mg/kg daily or 50 mg/kg 2X weekly

* Used when resistance to first-line TB drugs is suspected or in patients with central nervous system or disseminated TB.

RECOMMENDED DRUG REGIMENS FOR THE TREATMENT AND
PREVENTION OF TUBERCULOSIS

REGIMENS	HIV Negative	HIV Positive
TREATMENT		
Initial Phase	2 months INH/RIF/PZA daily	2 months INH/RIF/PZA daily
Continuation Phase	4 months INH/RIF daily or 2X weekly	7 months INH/RIF daily or 2X weekly
Total	**6 months**	**9 months**
PREVENTION		
Total	6 months INH daily or 2X weekly	12 months INH daily or 2X weekly

Since tubercle bacilli are very difficult to kill, TB can relapse if a drug regimen ends too soon or is interrupted. Relapse is frequently accompanied by the emergence of drug-resistant tubercle bacilli, making treatment much more complex and expensive. Unless a preventive or curative regimen is completed without interruption, there is an increased chance that TB disease will develop or recur, and the person may become infectious. *To make sure that inmates take their medication, staff should directly observe the ingestion of each dose.* Direct observation involves both watching the inmate swallow and checking the hands and mouth to ensure compliance; this is often the only way to ensure that medication is actually taken.

Because some people may have side effects from the drugs, staff should monitor at least monthly all those taking anti-TB drugs. This is especially important for those who are taking other medications or who have a history of alcohol abuse. Staff who administer TB drugs should be familiar with common side effects and adverse reactions, and should have specific protocols for management and evaluation as needed.[7]

Staff may need expert advice for the handling of adverse reactions to medication and for the management of complicated cases (i.e., drug resistance, extrapulmonary disease, or disease in a pregnant woman). Local health departments or state TB control programs can serve as a resource for consultation or assistance with difficult cases.

All inmates and employees who have started treatment or preventive therapy and will be leaving the facility before completing their regimen should be referred by correctional facility staff to the health department's TB control program. Inform the health department of the medical status and locating information of all such individuals, and facilitate continuity of care after release by scheduling specific appointments for inmates prior to release.

ASSESSMENT

Assessment gives information on how effectively the TB control program is functioning. Assessment involves record-keeping and monitoring rates of infection and disease.

Medical records must be organized to ensure that all inmates and staff are monitored and that none are lost due to transfer, release, dismissal, or retirement. TB skin test status and TB medication history should be kept current and located prominently in individual medical records. Copies of such records should be forwarded to other facilities in case of transfer or to the health department in case of the inmate's release. This will ensure continuity of care and lower the risk of developing drug- resistant organisms as a result of treatment lapses.

A TB Summary Record, such as the prototype in Appendix II, is essential for efficiently tracking and assessing the status of persons with TB disease or infection. The record can also provide data needed to assess the overall effectiveness of TB control efforts. The following data should be collected and tabulated separately for inmates and staff at least once every 6 months:

A) Total population within facility
B) Number currently infected
C) Number newly infected*
D) Number infected who are started on preventive therapy
E) Number who complete preventive therapy
F) Number TB cases diagnosed
G) Number diagnosed cases who complete treatment
H) Number infectious TB cases, i.e., sputum-smear positive for AFB
I) Number infectious cases becoming non-infectious in 3 months or less

From the above data, the following evaluation measures should be calculated:

- TB case numbers (F)
- TB case rates (divide [F X 100,000] by A)
- the rate of TB conversion (divide C by A)
- the percentage of cases completing treatment (divide G by F), which should be $\geq 95\%$
- the prevalence of TB infection (divide B by A)
- the percentage of infectious cases becoming culture negative in three months (divide I by H), which should be $\geq 90\%$
- the percentage of infected individuals completing therapy (divide E by D), which should be $\geq 90\%$

* "Newly infected" includes all persons whose TB skin test has converted from negative to positive within the past two years.

These evaluation measures should be reviewed annually with correctional facility and health department staff, and should be compared with previous data and with data from other facilities in the area. For multi-institutional systems, these data should be compiled for individual institutions and for the system as a whole.

Role of the Health Department

Correctional facilities should work closely with their health department TB program in planning and implementing these recommendations. Health department TB programs can often assist by:

- collaborating in the development and revision of policies, procedures, and record systems for TB control;
- training staff to perform TB skin testing and other diagnostic procedures, to initiate and observe therapy for treatment and prevention, to monitor for side effects, to educate inmates and staff, and to maintain record systems;
- assisting with referrals and contact investigations; and
- providing consultation on how to reduce TB transmission in facilities and medically manage people with TB infection or disease.

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CASE STUDY: TB OUTBREAK AT "CORRECTIONAL STATE" PRISON

This case study is for use in initiating discussion of the issues and obstacles in implementing a TB control program.

"John Doe", a 29-year-old former IDU, had been in Correctional State Prison for 15 months when he developed a cough. Since Doe was also a chain smoker, no one thought his cough was unusual. When he entered Correctional State, Doe's HIV antibody test was negative. His TB skin test reaction size at entry was 6 mm, which was not considered a positive reaction. (Correctional State has a policy of giving TB skin tests to inmates at entry; after this, they are not retested unless an outbreak occurs.)

One month after the cough started, Doe reported to the clinic complaining that he felt ill and was tired all the time. While in the clinic, he had several episodes of coughing. The clinic nurse noted that Doe had a slightly elevated temperature, and had lost ten pounds since his entry physical examination. The doctor started Doe on antibiotics for an acute respiratory infection.

Doe did not improve while taking the medication, and in one week was back in the clinic, complaining that he felt worse. He had lost an additional ten pounds. The nurse suspected TB. She gave Doe a tuberculin skin test and sent him to the health department for a chest x-ray. Two days later, Doe's skin test reaction was 14 mm. The chest x-ray was abnormal and revealed a small hole (cavity) in his left lung.

The nurse collected a sputum specimen for AFB smear and culture. Officers transferred John Doe into AFB isolation at the nearby state hospital, since Correctional State had no AFB isolation facilities. He was started on a six-month regimen of three TB drugs (INH, RIF, and PZA).

At the hospital, the physician in charge suspected that Doe might be infected with HIV; as a former IDU, Doe was at risk. Doe admitted sharing needles and syringes frequently when he was using drugs, from 1984 to 1989. A repeat HIV test showed that Doe was HIV positive. The doctor decided to lengthen Doe's TB treatment regimen to nine months.

The sputum smear taken in the Correctional State Prison clinic showed large numbers of AFB, and was later confirmed by the state lab to grow *M. tuberculosis* on culture. Doe remained in AFB isolation. After two weeks of directly observed treatment, Doe had three negative sputum smears and was no longer considered infectious. He was transferred back to Correctional State, where he finished a total of nine months of directly observed TB treatment.

Meanwhile, a contact investigation was started at Correctional State. Doe had been housed in Building A for his entire stay in prison. Building A housed 78 prisoners, 25 of whom were on the same tier as Doe. Each tier had a separate ventilation system, so only these 25 inmates were skin tested. Five correctional workers had worked frequently on that tier and were also tested.

Two inmates had a documented history of a positive tuberculin skin test when they entered Correctional State; neither had ever taken anti-TB drugs. Ten of the other inmates and three correctional workers had positive skin tests, with reactions of 5 mm or greater. One of the three correctional workers had a fever and said he felt sick. One other inmate, "John Jones," was HIV positive but had no reaction to the TB skin test. All 16 received a chest x-ray.

Two inmates and the correctional worker with symptoms had abnormal chest x-rays and needed further tests. All three were identified as TB suspects and placed on 6-month treatment regimens. None had a positive HIV test.

The remaining 12 who had TB infection without disease were placed on preventive therapy. Jones (the HIV-positive inmate) began a full year of preventive therapy even though his skin test and x-ray had been negative.

Correctional State reported this outbreak to state health department TB program authorities. Twelve weeks after the first TB skin tests were given, the correctional nurse and staff from the State Department of Health retested all inmates and correctional workers from Building A who had originally had negative skin tests. They discovered five more skin test reactors, but no cases of active TB disease. All five reactors were placed on INH preventive therapy.

Questions:

1. How could this outbreak have been avoided?

2. What kinds of screening and education activities are needed at Correctional State?

3. Should a contact investigation into a larger concentric circle be initiated?

APPENDIX I

RISK ASSESSMENT FOR HIV TESTING IN PERSONS WITH TB INFECTION OR DISEASE

Special management of TB infection or disease is required if HIV infection is also present. Thus, all persons who have positive TB skin tests or active TB should be counselled regarding HIV. The following is a list of behaviors that may have led a person to become infected with HIV. Encourage anyone with one or more of the following risks to be tested for HIV infection, even if the risk occurred years ago. Remember, a negative HIV test does not mean immunity to becoming HIV-infected in the future—risk behaviors should stop immediately, regardless of test results.

RISK FACTORS FOR INFECTION WITH HIV (THE AIDS VIRUS)

Have you had vaginal, anal, or oral sex with:

- someone who has HIV infection;
- someone who uses IV drugs or practices skin popping;
- someone who received blood or blood products between 1978 and 1985;
- someone with a blood disorder such as hemophilia;
- a male who has sex with other males;
- anonymous partners or prostitutes;
- anyone who has had sex with someone with the above risk factors; or
- anyone whose risks for HIV infection you don't know?

Have you used a needle and/or syringe for:

- IV drug use;
- skin popping;
- tattooing;
- ear piercing;
- steroid use; or
- vaccinations in foreign countries?

Have you been exposed to blood or to body fluids containing visible blood through:

- needle sticks;
- mucous membrane exposure;
- receipt of blood or blood products (between 1979 and 1985); or
- injections for treatment of blood disorder (between 1979 and 1985)?

Uncontrolled or unknown behavior during:

- lapses of memory when drinking alcohol;
- drug-induced lapses of memory; or
- psychotic episodes?

APPENDIX II

Confidential Tuberculosis Summary Record

The Prototype Confidential Tuberculosis Summary Record is designed to update the tuberculosis status of each inmate and employee in a correctional facility. This record may be kept in a central location (e.g., in the infection control office) or may be kept in individual patient or staff medical records. The form should not replace the tuberculosis diagnostic and treatment information found in the medical records of persons with tuberculosis symptoms or of those persons receiving anti- tuberculosis medications.

The form can also be used to prepare statistical reports and to track residents and employees requiring periodic skin testing. This information is important for assessing the overall effectiveness of tuberculosis control efforts in a facility. If kept current, the data on the forms can be summarized periodically and compared with previous data in order to determine, among other measures:

1. The number of staff and inmates currently infected with TB
2. The number of persons newly infected
3. The number of persons started on preventive therapy
4. The number of persons completing therapy (goal is > 95%)
5. The number of diagnosed cases of TB
6. The number of diagnosed cases who complete treatment (goal is > 95%)
7. The number of infectious cases, i.e., sputum-smear positive for AFB
8. The number of infectious cases becoming non-infectious in 3 months or less

When tuberculosis is diagnosed, the form contains the necessary information for reporting the case to the state or local health department. The form also reflects whether or not 1) the case was reported, 2) a contact investigation was completed, and 3) HIV testing was performed. Summary information regarding the use of chemotherapy for infection or disease can also be recorded.

Many items on the form require only a check in the appropriate box. The format follows events in the order they are likely to occur in the diagnosis of tuberculosis infection and disease.

The first section of the form can be completed at the time of admission or employment; it documents personal information, as well as baseline skin-testing results. If baseline skin testing is negative, the results of retesting can be recorded on the second section of the form.

The final section of the form can be used to document x-ray and bacteriologic results, diagnosis, chemotherapy, and other information. This part of the form is generally used only for those inmates or employees who have tuberculous infection or disease, those who have tuberculosis symptoms, or those who require follow-up after exposure to tuberculosis.

APPENDIX II (Continued)

PROTOTYPE TUBERCULOSIS SUMMARY RECORD FOR CORRECTIONAL FACILITIES

Local Institution Name
Local Institution Address
Local Institution Phone

NAME: Last First Middle	Date of Entry/ Employment: ☐☐ ☐☐ ☐☐ Mo Day Yr	Cell Number or Work Location: _____	SS Number: ☐☐☐ ☐☐ ☐☐☐☐	ID Number:

☐ Inmate ☐ Employee — Home Address _____ Phone: ( ) _____

DOB: ☐☐ ☐☐ ☐☐ Mo Day Yr — Country of Birth: _____	RACE: ☐White ☐Black ☐Amer. Ind. or Alaskan Native ☐Asian or Pacific Islander	ETHNIC ORIGIN: ☐Hispanic/Latino ☐Non Hispanic

BASE LINE TESTING

INITIAL SKIN TEST: (or Documented History of Positive Mantoux) Date Given ☐☐ ☐☐ ☐☐ Mo Day Yr — Date Read ☐☐ ☐☐ ☐☐ Mo Day Yr — Size: ☐☐ mm — Was Therapy Recommended: ☐ Yes ☐ No

Skin Test Date	Size	Skin Test Date	Size	Skin Test Date	Size	Skin Test Date	Size	Skin Test Date	Size
	mm		mm		mm		mm		mm
	mm		mm		mm		mm		mm
	mm		mm		mm		mm		mm

X-RAY: Date ☐☐ ☐☐ ☐☐ Mo Day Yr ☐Normal ☐Abnormal	IF ABNORMAL: ☐Cavitary ☐Stable ☐Non Cavitary ☐Worsening	HISTORY OF PREVIOUS TB TREATMENT: ☐Infection ☐TB Disease Dates _____ _____

BACTERIOLOGY FOR *M. TUBERCULOSIS:* AFB Smear ☐ ☐ Culture ☐ ☐ Pos Neg Date Collected _____ Source _____

DIAGNOSIS DATE: ☐☐ ☐☐ ☐☐ Mo Day Yr ☐Active TB ☐TB Infection w/o disease

CHEMOTHERAPY FOR INFECTION OR DISEASE:

Drugs	Prescribed	Date Started	Date Stopped	Reason Stopped
INH	☐	☐☐☐☐☐☐	☐☐☐☐☐☐	_____
PZA	☐	☐☐☐☐☐☐	☐☐☐☐☐☐	_____
RIF	☐	☐☐☐☐☐☐	☐☐☐☐☐☐	_____
EMB	☐	☐☐☐☐☐☐	☐☐☐☐☐☐	_____
Other:_____		☐☐☐☐☐☐	☐☐☐☐☐☐	_____

Drug Resistance? ☐No ☐Yes
Supervised by: _____
If No Chemotherapy given, reason: _____

FOR ACTIVE TB:

Major Site of Disease
☐Pulmonary ☐Other (Specify_____)
Case Reported to Health Department? ☐Yes ☐No
Date of Report: (Mo/Day/Yr) ☐☐ ☐☐ ☐☐
Contact Investigation Done? ☐Yes ☐No
If Yes, Date: ☐☐☐☐☐☐ Follow-up Date: ☐☐☐☐☐☐

HIV TEST: Date ☐☐☐☐☐☐ Mo Day Yr ☐Positive ☐Negative ☐Borderline
If Not Done, Give Reason: _____

Date	Event/Comment:	Date	Event/Comment:

References:

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*U.S. Government Printing Office: 1992 — 632-867